



# VII Michigan Program Concept of Operations

Stakeholder Presentation

October 7, 2005

Metro Region Office

Southfield, MI

# Agenda

- Background
- What VII Means to Michigan
- VII Michigan Program
- Concept of Operations Process
- Closing Remarks

# What is VII?

## Background

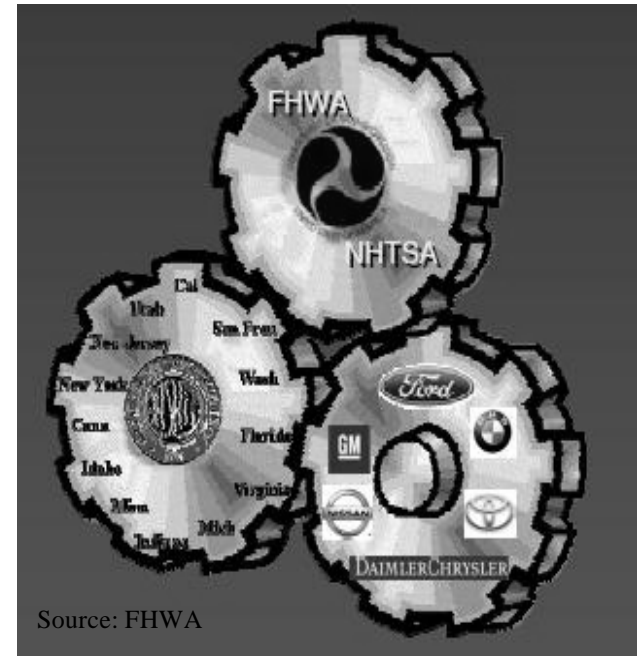
## What VII Means to Michigan

## VII Michigan Program

## Concept of Operations

## Closing Remarks

- An “Enabling Communication Infrastructure” to support Vehicle-to-Vehicle and Vehicle-to-Infrastructure Communications
- National consortium
  - Automotive Industry
  - AASHTO / DOTs
  - USDOT / FHWA
  - Technology Vendors
- Address emphasis on:
  - Crash / fatality avoidance
  - Roadway operations
  - Intelligent Vehicles
  - Evolution of communications



# Vast Potential of VII

Background

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- Improved traffic safety
- Enhanced mobility
- Increased traveler information
- Improved transportation planning
- Road condition monitoring
- Advance interface between auto industry and customers
- Telematics
- Commercial services
- Many others . . .

# VII is *Safer Roads*

## Background

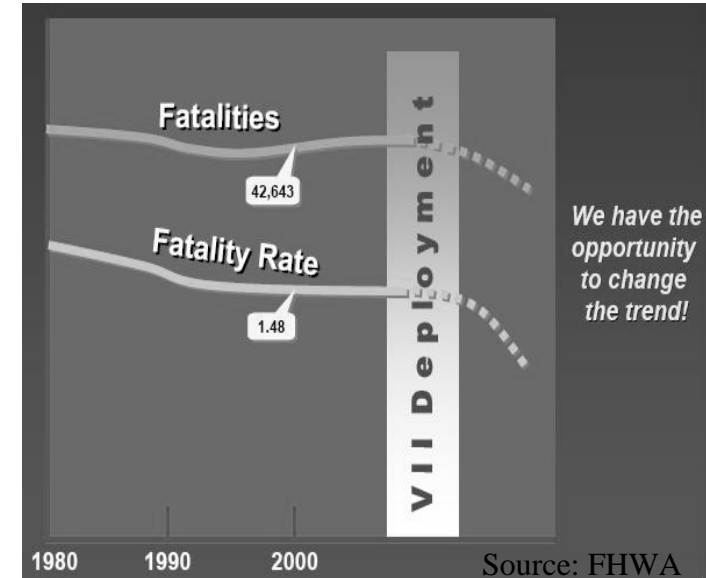
## What VII Means to Michigan

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## Closing Remarks

- Vehicle / infrastructure cooperation is a critical element for preventing:
  - Intersection collisions
  - Road departure collisions
- These two factors account for 50% of the crashes and fatalities on our roads



# VII Means Saving Lives

**Background**

**What VII Means to Michigan**

**VII Michigan Program**

**Systems Engineering**

**Concept of Operations**

**Closing Remarks**

- VII has the potential to reduce the worst kind of crashes: intersection collisions
- Safer roads for Michigan residents and visitors
- Improved safety and security of freight movement
- Improved emergency response

# VII is *More Efficient Roads*

## Background

## What VII Means to Michigan

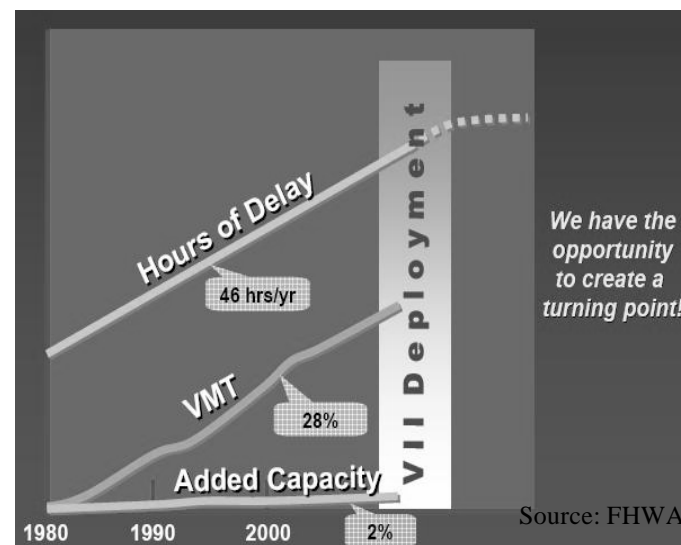
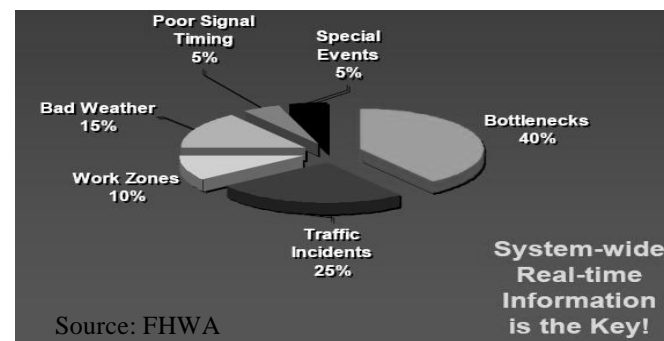
## VII Michigan Program

## Systems Engineering

## Concept of Operations

## Closing Remarks

- Reducing the effects of events (e.g., traffic incidents, work zones, weather)
  - *Provides “double” congestion relief:*
    - More Predictable
    - Lower overall delay
  - *Improves safety*
    - Reduce motorist exposure to unsafe conditions
  - *Saves fuel*
  - *Reduces emissions*



# VII Means a Stronger Economy

- Follows MDOT goal to invest in growing economy

“...providing the highest quality integrated transportation services for economic benefit and improved quality of life...”

- Bring the right type of jobs to MI – combines technology and automotive industry
- Strengthen existing automotive industry
- Increase mobility throughout the region – work force and freight

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# Purpose of VII Michigan

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- Test feasibility of concept
- Identify institutional and technical applications and issues
- Develop stakeholder partnerships and roles
- Compliment other national test efforts
- Develop framework for testing a wide variety of communications technologies

# Michigan's Investment in VII

Background

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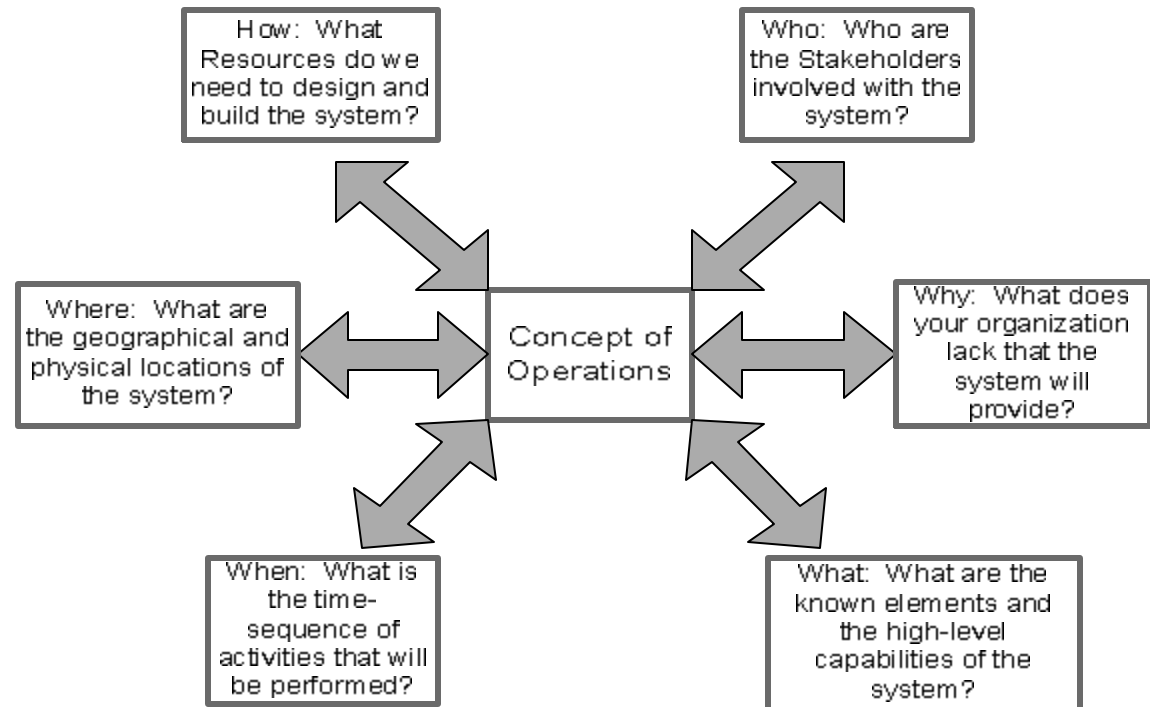
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- The State of Michigan is committed to being at the forefront of VII:
  - Investment of dollars and staff efforts
  - Development of enabling infrastructure within public right-of-way
  - Coordination of multiple stakeholders in the automotive and telecom industries
- *Concept of Operations* is a means to ensure that the investment is spent effectively

# Concept of Operations

- COO process from American National Standards Institute and American Institute of Aeronautics and Astronautics (ANSI / AIAA)
- COO answers “Who, What, When, Where, Why and How?”



# Who are VII Michigan Partners?

- Public-Sector Stakeholders:
  - Michigan Department of Transportation (MDOT)
  - Federal Highway Administration (FHWA)
  - Road Commission for Oakland County (RCOC)
  - Road Commission of Macomb County (RCMC)
  - City of Detroit

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# Who are VII Michigan Partners?

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- Original Equipment Manufacturers (OEMs):
  - General Motors
  - DaimlerChrysler Corporation
  - Ford Motor Company
  - Nissan Motors North America
- Communications Carriers:
  - Motorola
  - Azulstar Networks (i.e. Ottawa Wireless)

# Who are VII Michigan Partners?

Background

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- Automotive Equipment Suppliers
  - Motorola
- Traffic Control Equipment Suppliers
- Research Institutions:
  - University of Michigan Transportation Research Institute (UMTRI)

# What is the VII Michigan Test Bed?

## Elements:

- Vehicles/On-Board Equipment
- Roadside Equipment
- Communications Infrastructure
- Private-Sector Test Bed Facilities
- MDOT / Public-Sector Centers
- Data Processing and Archiving Facilities

**Background**

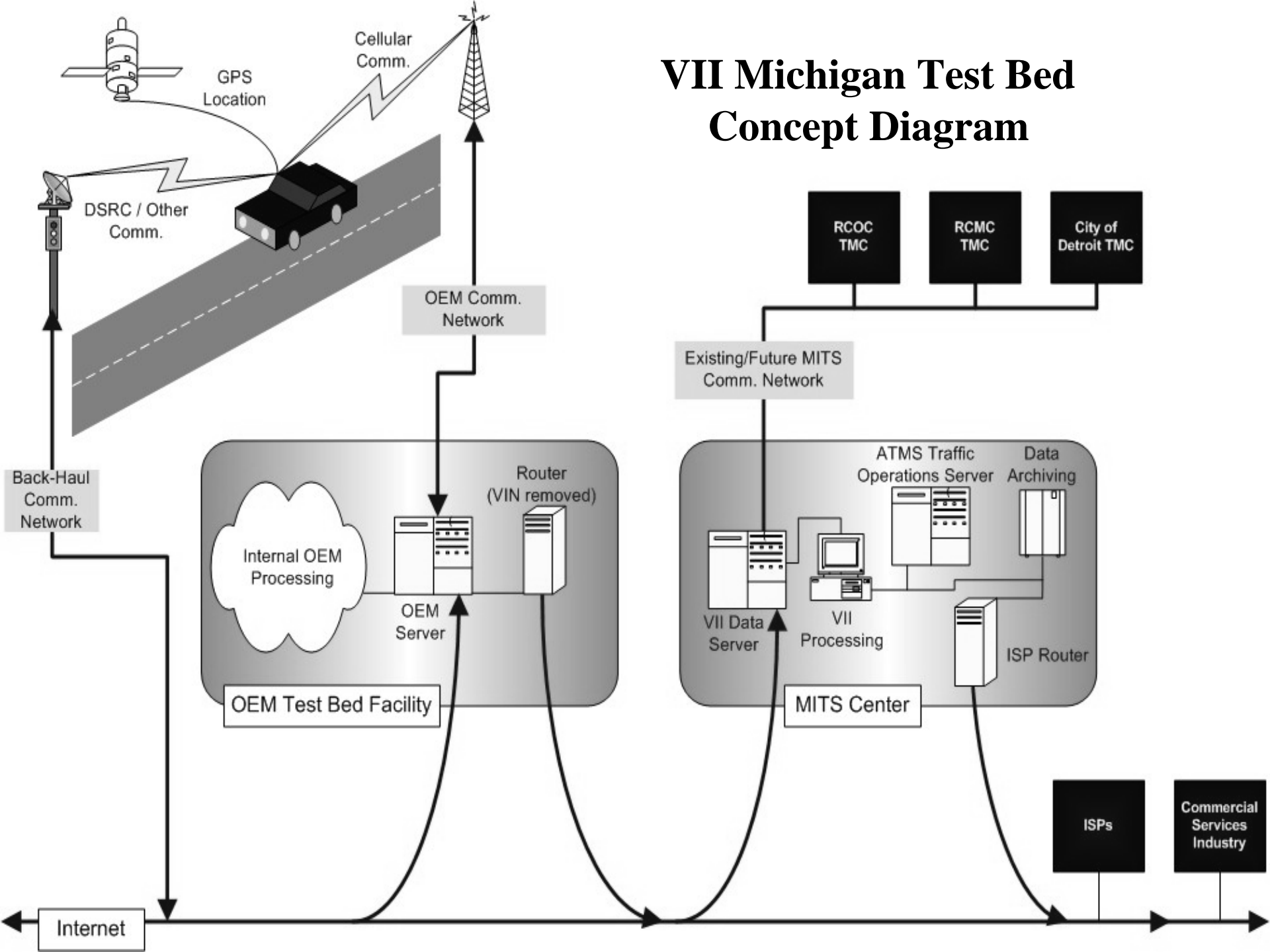
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# VII Michigan Test Bed Concept Diagram





# What is the VII Michigan Test Bed?

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- VII Michigan will enable open testing:
  - Wired / wireless
  - DSRC/802.11 Standards
  - Leased / agency-owned
- Between:
  - Vehicles and Infrastructure (V2I)
  - Vehicles to Vehicles (V2V)
  - Roadside to Centers
  - Center to Center

# When?

- VII Michigan Test Bed Program is multi-phased approach
- Goal: Region-wide test bed facilities to feed into FHWA FOT planning efforts (lessons learned)

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# Phased Approach

## Phase 1:

- Localized and autonomous private-sector test beds
- Private-sector technology concept testing
  - V2V
  - V2R
  - Roadside to servers
- Developing interfaces between private and public-sectors.
- MDOT / public-sector testing of data usage

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# Phased Approach

## Phase 2:

- Expanded RSU coverage
- Additional technology updating and testing
- Increased stakeholder interfaces
- Stakeholder coordination in identifying and solving technical and institutional issues

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# Phased Approach

## Phase 3:

- Region-wide interoperable RSU coverage
- Integration of test bed facilities, vehicles, and RSUs – non-localized
- Coordination between stakeholders to determine best-practices and protocol for interoperability
- Consolidating communications where possible

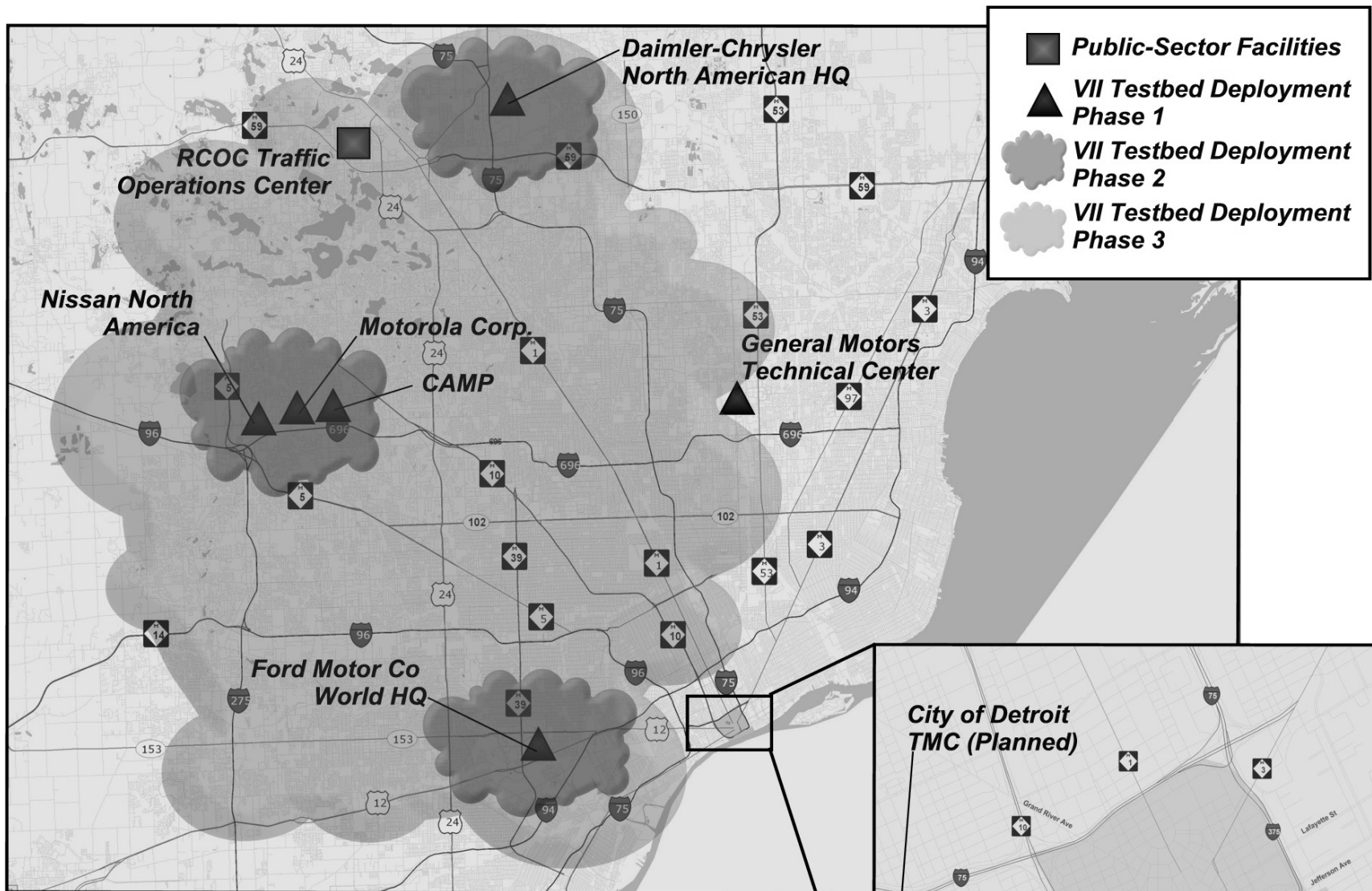
Background

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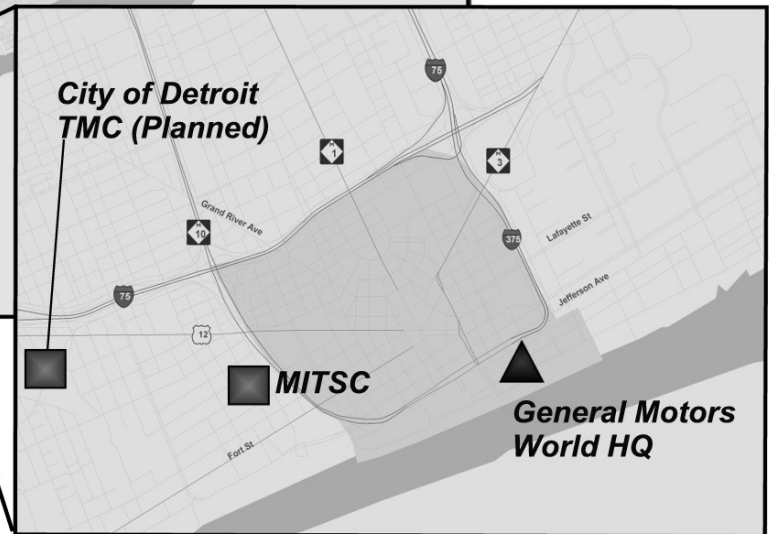
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# VII Michigan Test Bed Phased Approach



# Why VII Michigan Test Bed?

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- Incubate VII technologies and protocol
- Answer:
  - How to collect data?
  - Who/how to process data?
  - How to distribute data, and to whom?
  - Who/how to use data?
- Identify and solve institutional issues:
  - Responsibilities
  - Data access rights
  - Data security
  - Inter-agency/company agreements
  - Competitive market issues

# Where will the Test Bed be?

**Background**

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- **Field test locations:**
  - Auburn Hills (DaimlerChrysler)
  - Southfield (DaimlerChrysler)
  - Dearborn (Ford)
  - Farmington Hills (Nissan, Motorola and CAMP)
  - Warren (General Motors)
- **Data processing locations:**
  - Auburn Hills (DaimlerChrysler)
  - Dearborn (Ford)
  - Detroit (General Motors, MDOT-MITSC)
  - Farmington Hills (Nissan, Motorola and CAMP)
  - Pontiac (RCOC)



# How?

## Need for Clearly Defined Roles:

- Public Sector
- OEMs
- Suppliers
- Telecom Industry
- Research Partners

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# How? Private-Sector Roles

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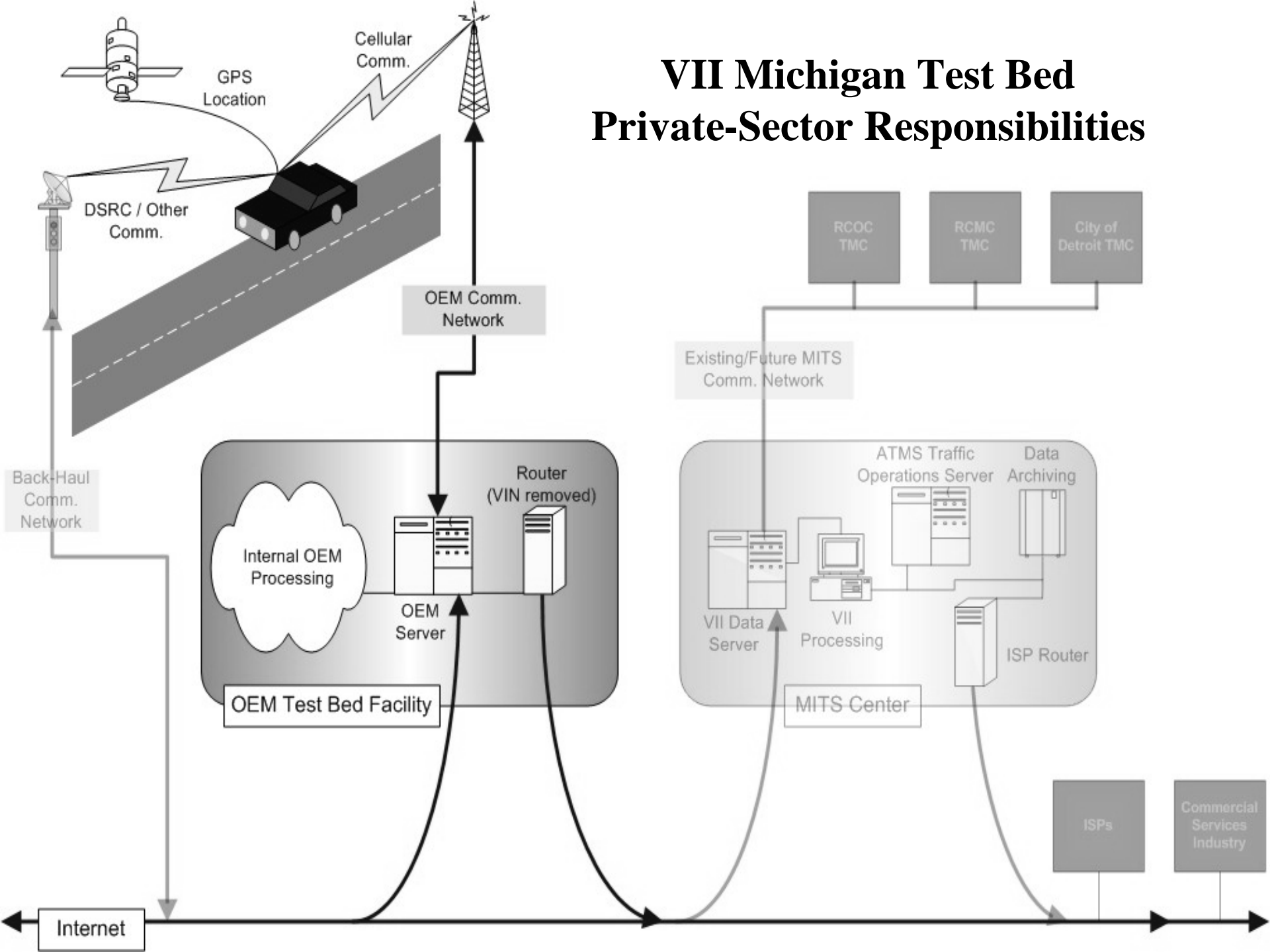
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- Planning, design, implementation, integration, testing, operation and maintenance of test beds, including:
  - Vehicle fleet and on-board equipment
  - Cellular, or other non-roadside based, communications systems
  - Private-Sector Test Bed Facilities/Server
  - Private-sector Internet connection and security systems
- Anonymizing and disseminating data collected to MDOT / public-sector via Internet

# VII Michigan Test Bed Private-Sector Responsibilities



# How? Public-Sector Roles

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- Design, deployment and integration of roadside-based communications networks
- Establishment of field Internet connections
- MITSC Internet connection and security systems
- Design, deployment, integration and maintenance of inter-agency communications linkages via the MITS communications system

# How? Public-Sector Roles

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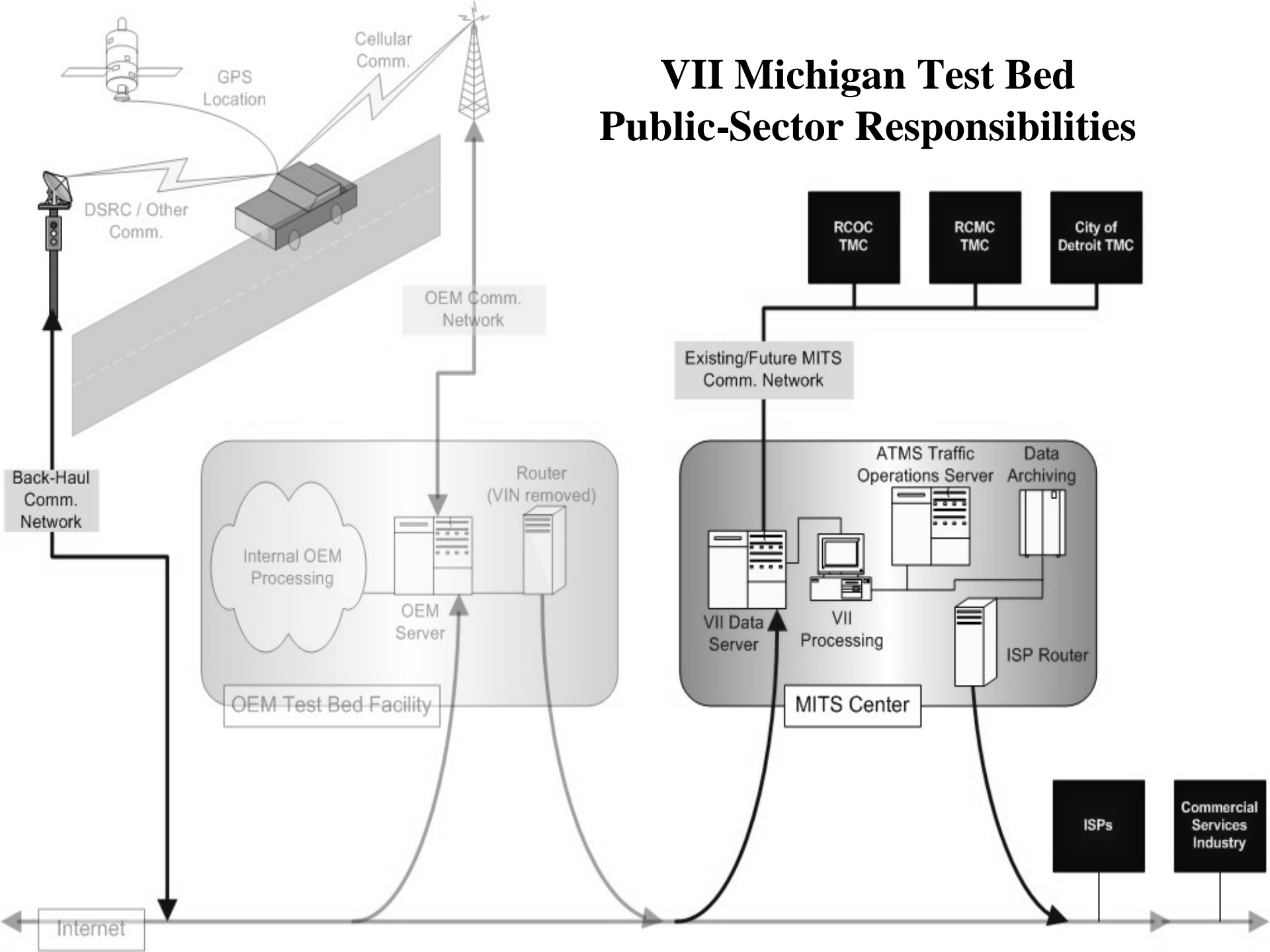
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- Development of a requirements document that sets forth public-sector stakeholder requirements. Will need private-sector input.
- Archiving anonymized data provided by the OEM's
- Development of a Michigan VII web site to post information regarding VII activities in Michigan

# VII Michigan Test Bed Public-Sector Responsibilities



# VII is Michigan's Future

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- VII means saving lives, safer roads
- VII means improved mobility and productivity
- VII means Michigan jobs and economic development

***The VII Michigan Test Bed Program is an investment in the future of our State and the safety of our citizens***